1323-4C-ATTO

URS

Tuchman Cleaners
Site # 1991 02 503
Site Characterization

June 9, 2004

Indiana Department of Environmental Management
100 North Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015

Attention: Ms. Dawn Shirley
State Cleanup Program, Office of Land Quality

Ladies and Gentlemen:

Interim Summary Report
Stage I Field Activities
Remedial Investigation (RI) Phase II
Tuchman Cleaners Facility
4401 N. Keystone Ave.
Indianapolis, Indiana
Incident #1991-02-503

INTRODUCTION

On behalf of Tuchman Cleaners (Tuchman), URS has prepared this interim summary report to present the results of Stage I activities of the Phase II Remedial Investigation (Phase II RI) at the Tuchman facility located at 4401 North Keystone Avenue in Indianapolis, Indiana. The Phase II RI was designed to address data gaps identified through the Phase I Remedial Investigation conducted in 2002-2003. This first stage of the Phase II RI focused on delineating the off site shallow groundwater impact, installing a deep piezometer, characterizing the groundwater flow conditions and the hydraulic relationships between the shallow, intermediate, and deep aquifers, and groundwater sampling from a representative set of monitoring wells.

The summary presents the data collected to date for subsequent planning of the upcoming Stage II activities. Upon completion of the Stage II activities, the Phase II RI report will be prepared and submitted to the Indiana Department of Environmental Management (IDEM). The report will follow the format prescribed by IDEM State Cleanup Program in Appendix 1 of the Risk Integrated System of Closure (RISC) User's Guide dated February 15, 2001.

URS Corporation
36 East 7th Street, Suite 2300
Cincinnati, OH 45202-4434
Tel: 513.651.3440
Fax: 513.651.3452

FIELD ACTIVITIES

The Stage I Field Activities were conducted between February 25 and April 8, 2004 in accordance with the RI Phase II Work Plan dated August 21, 2003. The Stage I field activities included three separate field efforts conducted in sequence to allow the results of the earlier efforts to be incorporated into the approach of subsequent efforts. The first field effort, conducted between February 25 and 27, 2004, involved the advancement of seven off site probes, three interior source area probes, and one probe at the future location of deep piezometer PZ-10D. The second field effort included the installation of PZ-10D on March 18 and 19, 2004 and hydraulic flow monitoring and testing, which ran from March 18 through 22, 2004. The third field effort, conducted between April 6 through 8, 2004, involved the advancement of the remaining 10 off site probes and groundwater sampling of a representative set of monitoring wells on and off site. A brief summary of the field activities is discussed below.

OFF SITE GROUNDWATER ASSESSMENT

The off site probes OSP-1 through OSP-17 were advanced to delineate the off site shallow groundwater impact downgradient of the facility. Borings were advanced using a Geoprobe Model 66DT operated by Boart Longyear of Indianapolis, Indiana. To evaluate groundwater impact, one groundwater sample was collected from each probe for laboratory analysis. Seven probe locations immediately downgradient of the facility (OSP-1 through OSP-6 and OSP-13) were advanced during the first field effort to evaluate the extent of impact with potential to modify the remaining probe locations to provide optimum coverage of the further downgradient off site area. The subsequent ten probes were advanced at the planned locations except for OSP-10, which was moved from the western edge of 44th Street to the western sidewalk of North Keystone Avenue, in line with monitoring well MW-11 and off site probe OSP-13, as illustrated in Figure 1.

As a supplement to the scope of the RI-Phase II WP, three source area probes were advanced within the Tuchman Cleaners facility in the vicinity north of recovery well RW-3 (Figure 2). The probes were advanced to test for a deeper "Top of Till" surface in an effort to identify the presence or absence of Dense Non-Aqueous Phase Liquid (DNAPL) beyond the confirmed presence at RW-3. One groundwater sample was collected from the base of each temporary piezometer for laboratory analysis.

During all probe advancement, soil samples were screened for volatile organic compounds (VOCs) [including solvent-related compounds] in the field using a photoionization detector (PID) and divided into 2-foot intervals and placed in sealable plastic bags for subsequent headspace measurements. Soil samples were examined for DNAPLs under an ultraviolet (UV) light, as described by Cohen et al. (1992) where headspace screening yielded elevated PID reading (greater than 1,000 ppm) suggesting a potential for the presence of DNAPLs. As a confirmation to the field observations and measurements, three soil samples were selected for laboratory analysis based on initial PID measurements or visual evidence of contamination as determined by the field team.

DEEP PIEZOMETER INSTALLATION

The intermediate probe Pre-PZ-10D was advanced on February 27, 2004 at the planned location of the deep piezometer PZ-10D to evaluate the shallow and intermediate groundwater quality prior to installing the deep piezometer through these intervening zones. Groundwater samples were collected from each zone for laboratory analysis. Deep piezometer PZ-10D was installed on March 18 and 19, 2004 to 68.75 feet using an all-terrain vehicle (ATV) mounted CME-750 rig with 4.25 inner diameter (I.D.) hollow stem augers. The piezometer was constructed of 2-inch Schedule 40 polyvinyl chloride (PVC) with a 10-foot, 0.010-inch slotted screen.

HYDRAULIC TESTING

Set up for the hydraulic testing included the placement of In-Situ MiniTROLL water level data loggers in wells MW-4, MW-4I, MW-4D, MW-6I, MW-6D, and MW-13I for one-minute measurements from March 18 through 22, 2004. Two pressure transducers attached to In-Situ Hermit 1000C data loggers were also placed in selected wells during pumping tests to provide additional hydraulic response data.

The measurements collected between March 18 and early March 21 (before 9:00 AM) represent ambient groundwater conditions. Influences on ambient conditions include cyclic pumping from the Tuchman production well on Thursday, Friday, and Saturday during business hours and the Veolia Water Indianapolis, L.L.C. (Indianapolis Water Company [IWC]) production well FC-11 actively pumping from prior to the start of monitoring until the pump was turned off at noon on Friday, March 19, 2004.

Aquifer response to FC-11 operation was tested by stopping the well production at noon on March 19 (after several months of operation), then performing two pumping tests that ran from 9:00 AM to 11:20 AM on March 21 and again from 3:40 PM on March 21 to 7:00 AM on March 22. Water level data collection continued until 7:00 PM on March 22 in order to monitor hydraulic response.

During this same time period, the aquifer response was further tested by operation of the Tuchman bedrock production well. The well operates normally in response to the facility's daily water use for wet cleaning laundry. This use is typically greatest during the morning shift where pumping would turn on and off at an approximate frequency of 12 cycles per hour. To test the hydraulic response of a maximum pumping frequency, the well use was artificially elevated and sustained by opening multiple faucets within the facility between 3:42 PM and 5:51 PM on March 22. The well did not operate continuously during this time, but rather cycled on and off approximately 20 times per hour in rapid succession to maintain the necessary pressure within the water lines as water was drained through the faucets.

The hydraulic response to RW-1 operation was tested on March 22 between 12:15 PM and 2:18 PM. where RW-1 purged groundwater at approximately 9.5 gallons per minute (gpm).

IWC production well FC-17 was not tested because the pump was inoperable at the time of the hydraulic testing. RW-3 was also not tested because the well is currently housing a DNAPL pump and is not equipped to conduct a pumping test.

MONITORING WELL SAMPLING

A representative set of groundwater samples were collected from the existing monitoring wells to supplement the off site probes. These samples were collected using disposable polyethylene (PE) bailers and were submitted for laboratory analysis.

SAMPLE CUSTODY AND LABORATORY ANALYSIS

All samples were stored in coolers chilled with ice to maintain temperature at approximately 4°C. The sample coolers were shipped to the analytical laboratory under chain-of-custody protocol by a laboratory representative/courier.

All soil and groundwater samples were analyzed for VOCs using SW-846 Method 8260B, as described in the U.S. Environmental Protection Agency (EPA) publication, Test Methods for Evaluation of Solid Wastes, Physical/Chemical Methods (SW-846, 3rd Edition, Update 3).

RESULTS

As discussed in the RI Phase II Work Plan, the objectives of this second phase of investigation include: 1) delineation of off site shallow groundwater impact identified downgradient of the facility and 2) further characterization of the groundwater flow

conditions of the intermediate and deep groundwater zones and the hydraulic relationship between these units and the shallow aquifer.

HYDROGEOLOGIC CONDITIONS

Field data collected from continuous soil samples recovered during boring advancement and piezometer installation include initial PID screening of soil samples and PID headspace measurements from bagged soil samples, and visual and olfactory observations of the samples. These observations, measurements, and evaluations are reported on the boring logs that are presented in Appendix A.

The subsurface materials encountered during the Stage I field activities were consistent with the subsurface geology outlined in Section 5.1 of the Remedial Investigation Report (RI Report) dated April 4, 2003. At the off site probe locations, the elevation of the upper till (T-2) unit surface ranged from 699.6 feet, mean sea level (msl) at OSP-6 to 711.0 feet, msl at OSP-4. This data was incorporated with the existing data presented in the remedial investigation report to generate an expanded contour map of the top of till surface as illustrated on Figure 2.

The shallow groundwater zone was encountered within the upper sand and gravel unit as described in Section 5.2.1 of the RI Report. Groundwater level measurements collected on March 21, 2004 and April 6, 2004 are listed in Table 1 with measurements from previous sampling events included for reference. The measurements collected on April 6 were collected while recovery well RW-1 was operating, but the neighboring IWC production wells were not pumping. The shallow groundwater piezometric surface map presented in Figure 3 illustrates that groundwater in the vicinity of the western portion of the facility flows towards RW-1, which is consistent with previous groundwater level measurements.

CONTAMINATION DISTRIBUTION

The results of laboratory analysis of the soil and groundwater samples collected from the probes/borings are presented in Tables 2 and 3, respectively. The laboratory results of the groundwater samples collected from the representative set of monitoring wells are presented in Table 4. The laboratory reports are included in Appendix B; complete analytical reports, including the associated QC will be provided with the Phase II RI report.

The shallow groundwater analytical data from the Stage I field investigation reveal the presence of chlorinated volatile organic compounds (CVOCs) immediately downgradient of the facility. Figure 4 illustrates the CVOC concentrations from the OSP borings and the representative set of groundwater monitoring wells selected for analysis.

HYDRAULIC RESPONSE

The groundwater elevation data collected during the hydraulic monitoring is presented in Figure 5. The figure includes the groundwater level measurements collected from wells MW-4, MW-4I, MW-4D, MW-6I, MW-6D, and MW-13I using the MiniTROLLs and the March 21, 2004 groundwater measurements from wells MW-14I and PZ-10D using pressure transducers attached to Hermit 1000C data loggers. Bar graphs illustrating the timing of FC-11 operations and the timing of the RW-1 and Tuchman production well pumping tests are presented at the top of the chart.

At the outset of data collection, FC-11 had been in generally continuous operation at approximately 695 gpm (1 million gallons per day) for 93 days (since December 15, 2003). Under this condition, the intermediate zone potentiometric surface graded from east (MW-6I) to west (MW-13I, MW-14I), as did the deep groundwater zone (MW-6D to MW-4D). Conditions in the deep zone appear relatively static compared to the intermediate where MW-14I and MW-6I experienced an early disturbance and MW-6I systematically declined more than one foot between March 18 and 19. The early disturbance coincides with a

rainfall event, but the systematic decline in MW-6I does not correlate to any of the monitored input parameters.

When FC-11 was turned off on March 19 at 12:00 noon, water level rebounded close to 6 feet in both the intermediate zone and the deep zone. Start up and shut down of FC-11 on March 21 and 22 showed a similar hydraulic response to that observed on March 19. The data indicate that when FC-11 is not running, MW-6I becomes the downgradient well, suggesting a lesser degree of connectiveness to the bedrock aquifer pumped by FC-11. In the deep zone, the hydraulic gradient between MW-4D and MW-6D become negligible by comparison to the pumped condition. Later monitoring of the deep zone at PZ-10D suggests that it is upgradient of the other deep monitoring wells and may not be well connected.

Review of IWC's pumping records indicates that within the past year (March 26, 2003 through March 26, 2004), FC-11 was pumped for approximately 259 days. Consequently, the hydraulic influence attributable to FC-11 was present for approximately 72% of the time within the past year.

There was no observed connection between the bedrock aquifer pumped by FC-11 and the shallow groundwater zone. Conversely, the pumping of RW-1 in the shallow zone had no measurable impact on either the deep or intermediate zones.

Pumping of the Tuchman production well during normal facility operations and during the planned testing had a relatively small impact on the intermediate and deep groundwater zones. This can be seen in the small drawdown signatures in monitoring wells MW-4I, MW-13I, MW-4D, and MW-6D on March 19, 20, and 22. The lack of signature or very subtle signature in MW-6I further suggests a poor or indirect connection with the pumped bedrock zone and select locations within the intermediate groundwater zone. Tuchman's production well apparently does not significantly influence the direction of groundwater flow in either the deep or intermediate groundwater zones.

PLANNING FOR STAGE II ACTIVITES

Tuchman anticipates meeting with IDEM to review the Stage I assessment results in light of the Stage II Phase II RI objectives in order to identify appropriate modifications to the assessment plan. Tuchman anticipates discussing the appropriate direction(s) of downgradient assessment in the intermediate groundwater zone. The addition of more shallow source area assessment borings, the scope of monitoring well sampling needed to continue/update characterization of site conditions, and other assessment issues with IDEM prior to initiating Stage II activities.

-oo0oo-

If there are any questions regarding this letter, please do not hesitate to contact the undersigned at 513-651-3440 or Mr. Randy Jackson representing Tuchman Cleaners at 913-671-8405.

Very truly yours,

URS

William R. Eckhoff
Geologist

Dennis P. Connair, L.P.G. #1535
Principal

WRE/DPC/Tuchman server
14944888.05550

Copy: Mr. Randy Jackson

TABLE 1

GROUNDWATER ELEVATIONS
STAGE I FIELD ACTIVITIES
REMEDIAL INVESTIGATION - PHASE II

TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA

Well No.	Reference Elevation* (feet)	12/26/02 Groundwater Elevation (feet)	2/19/03 Groundwater Elevation (feet)	3/19/04 Groundwater Elevation (feet)	4/6/04 Groundwater Elevation (feet)
MW-1	728.16	716.01	715.78	717.26	717.86
MW-3	727.2	716.1	715.87**	717.37	717.99
MW-4	727.71	716.00	715.80	717.29	717.91
MW-4I	727.55	-	714.40	709.76	715.94
MW-4D	727.56	-	710.16	707.20	708.41
MW-5	727.84	716.14	715.76	717.16	717.77
MW-6	728.33	716.45	716.14	717.86	718.55
MW-6I	728.22	713.48	714.25	710.98	716.26
MW-6D	728.2	-	710.46	707.71	709.07
MW-7	728.22	716.14	715.82	717.39	718.01
MW-8	727.87	716.05	715.82	717.31	717.92
MW-9	727.81	715.89	715.79	717.06	717.64
MW-10	728.56	716.25	715.92	717.48	718.14
MW-11	727.49	716.04	715.74	717.19	717.83
MW-12	728.08	-	715.72	717.18	717.83
MW-13	729.05	-	715.19	716.38	716.88
MW-13I	729.05	-	715.17	709.50	715.91
MW-14	728.4	-	715.21	716.47	716.93
MW-14I	728.4	-	715.00	709.51	715.90
MW-15	728.43	-	715.95	717.58	718.28
MW-16	727.37	-	716.02	717.73	718.35
MW-17	727.88	-	715.67	716.91	717.49
OSP-3	727.37	-	-	715.26	715.57
OSP-4	737.21	-	-	715.16	715.54
OSP-13	731.37	-	-	716.37	716.96
PZ-10D	727.99	-	-	711.77	712.79

* Monitoring wells were surveyed on February 20-26, 2003 by Beacon Engineering of Indianapolis, Indiana. Reference elevations are relative to NAD 27 sea level datum.

** Water level taken the following day (2/20/03) because the well was inaccessable on February 19, 2003 (covered by substantial slush and water).

"-" = Monitoring locations not present at time of water level measurement (monitoring wells installed in February, 2003; off-site probes [OSP] and PZ-10D were installed between February and April 2004).

TABLE 2

ANALYTICAL RESULTS SUMMARY
SOIL SAMPLING - STAGE I FIELD ACTIVITIES
REMEDIAL INVESTIGATION - PHASE II

TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA

Parameters	RISC Closure Level* Residential	RISC Closure Level* Industrial	Soil Borings OSP-11 (0-2 ft)	Soil Borings OSP-14 (14-16 ft)	Soil Borings OSP-16 (2-4 ft)	Soil Borings PZ-10D (58 ft)
Volatile Organic Compounds (mg/kg)						
cis-1,2-Dichloroethene	0.4	5.8	-	-	-	-
Tetrachloroethene	0.058	0.64	-	-	-	-
Trichloroethene	0.057	3	-	-	-	-

= Concentration exceeds RISC closure level for a residential setting

* = RISC Closure levels are derived from Table A within Appendix A of the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Technical Guide (July 24, 2001)

TABLE 3

ANALYTICAL RESULTS SUMMARY
GROUNDWATER SAMPLING - STAGE I FIELD ACTIVITIES
FEBRUARY TO APRIL 2004
REMEDIAL INVESTIGATION - PHASE II

TUCHMAN CLEANERS
4401 KEYSTONE AVENUE
INDIANAPOLIS, INDIANA

Parameters	RISC Closure Level* Residential	RISC Closure Level* Industrial	Off-Site Probe (OSP) Locations OSP-1	OSP-2	OSP-3	OSP-4	OSP-4 Dup OSP-100	OSP-5	OSP-6	OSP-7	OSP-8	OSP-9
Volatile Organic Compounds (mg/L)												
Acetone	0.950	92.000	-†	-†	-†	-†	-†	-†	-†	-†	-†	-†
Benzene	0.005	0.052	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	0.080	0.080	-	-	-	-	-	-	-	-	-	-
2-Butanone			-	-	-	-†	-†	-	-	-	-	-
Carbon Tetrachloride	0.005	0.022	-	-	-	-	-	-	-	0.0013 J	-	-
Chloroform	0.080	1.000	-	-	-	-	-	-	-	0.0016 J	-	-
1,1-Dichloroethane	0.007	10.000	-	-	-	0.0028 J	0.0035 J	-	-	-	-	-
cis-1,2-Dichloroethene	0.070	1.000	0.042	0.059 J	0.0041 J	0.016	0.018	0.25	0.022 J	0.019	0.069	0.0076 J
trans-1,2-Dichloroethene	0.100	2.000	-	-	-	-	-	-	-	0.0011 J	-	-
Ethylbenzene	0.700	10.000	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	0.005	0.380	-†	-	-†	-†	-†	0.011 J	0.016 J	-†	-†	-
Tetrachloroethene	0.005	0.055	0.8	1.4	0.19	0.14	0.14	1.3	1.5	0.12	0.89	0.44
Toluene	1.000	20.000	-	-	-	-	-†	-	-	0.00088 J	-	-
1,1,1-Trichloroethane	0.200	29.000	-			0.027	0.025	-	-	0.02	0.016 J	-
Trichloroethene	0.005	0.050	0.021 J	0.08	0.0024 J	0.013	0.014	0.1	0.014 J	0.0067	0.037 J	0.0083 J
Cumulative CVOC Concentration			0.863	1.539	0.1965	0.1718	0.1755	1.65	1.536	0.1468	0.996	0.4559

☐ = Concentration exceeds RISC closure level for a residential setting

* = RISC Closure levels are derived from Table A within Appendix A of the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Technical Guide (July 24, 2001)

CVOC = Chlorinated volatile organic compounds

B = Constituent detected in Method Blank

J = Estimated value

† = Low level detections were reported for this sample and the associated Method Blank and/or Trip Blank. In accordance with the U.S. EPA Contract Laboratory Program National Functional Guidelines or Low Concentration Organic Data Review (2001). These detections were qualified as not detected above its respective reporting limit.

14944888.05550
Tuchman - Keystone Ave.

6/9/2004

TABLE 3 (Continued)

Parameters	RISC Closure Level* Residential	RISC Closure Level* Industrial	Off-Site Probe (OSP) Locations OSP-10	OSP-10 Dup OSP-100	OSP-11	OSP-12	OSP-13	OSP-14	OSP-15	OSP-16	OSP-17
Volatile Organic Compounds (mg/L)											
Acetone	0.950	92.000	0.14 J	-	-†	-†	-†	-	-†	-†	-†
Benzene	0.005	0.052	-	-	-	-	-	0.00058 J	0.00059 J	0.00029 J	0.00035 J
Bromodichloromethane	0.080	0.080	-	-	-	-	-	-	0.00064 J	-	-
2-Butanone			-	-	0.0027 J	-	-	-	0.0014 J	-	-
Carbon Tetrachloride	0.005	0.022	-	-	-	-	-	-	-	-	-
Chloroform	0.080	1.000	-	-	0.00064 J	0.067	-	-	0.018	0.00031 J	-
1,1-Dichloroethane	0.007	10.000	-	-	0.00098 J		-	-	-	-	-
cis-1,2-Dichloroethene	0.070	1.000	-	-	0.032	0.15	-	0.0022 J	0.0004 J	-	-
trans-1,2-Dichloroethene	0.100	2.000	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.700	10.000	-	-	-	-	-	-	-	0.00019 J	-
Methylene Chloride	0.005	0.380	-†	-†	-†	-	-†	-	-†	-	-†
Tetrachloroethene	0.005	0.055	5	3.5	0.091	1.0	5.5	0.061	0.0049	0.016	0.037 J
Toluene	1.000	20.000	-	-	0.00064 J	-	-	0.0012 J	0.00094 J	0.00057 J	0.00066 J
1,1,1-Trichloroethane	0.200	29.000	-	-	0.023	0.029 J	-	-	-	-	-
Trichloroethene	0.005	0.050	-	-	0.023	0.073	-	0.00074 J	-	-	0.0007 J
Cumulative CVOC Concentration			5	3.5	0.14698	1.2	5.5	0.06394	0.0053	0.016	0.0377

☐ = Concentration exceeds RISC closure level for a residential setting

* = RISC Closure levels are derived from Table A within Appendix A of the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Technical Guide (July 24, 2001)

CVOC = Chlorinated volatile organic compounds

B = Constituent detected in Method Blank

J = Estimated value

† = Low level detections were reported for this sample and the associated Method Blank and/or Trip Blank. In accordance with the U.S. EPA Contract Laboratory Program National Functional Guidelines or Low Concentration Organic Data Review (2001). These detections were qualified as not detected above its respective reporting limit.

TABLE 3 (Continued)

Parameters	RISC Closure Level* Residential	RISC Closure Level* Industrial	Interior Surface Area Probes (IB) PRE PZ-10D Shallow	PRE PZ-10D Intermediate	IB-1	IB-2	IB-3	QA Samples Trip Blank 2/27/04	Trip Blank 4/7/04
Volatile Organic Compounds (mg/L)									
Acetone	0.950	92.000	-†	-†	-†	-†	-†	0.0041 JB	0.74 J
Benzene	0.005	0.052	0.00035 J	0.0003 J			0.00033 J	-	-
Bromodichloromethane	0.080	0.080	-	-	-	-	-	-	-
2-Butanone			-†	-†	-	-	0.00065 J	0.0024 J	-
Carbon Tetrachloride	0.005	0.022	-	-	-	-	-	-	-
Chloroform	0.080	1.000	-	-	-	-	-	-	-
1,1-Dichloroethane	0.007	10.000	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	0.070	1.000	-	-	-	-	0.00037 J	-	-
trans-1,2-Dichloroethene	0.100	2.000	-	-	-	-	-	-	-
Ethylbenzene	0.700	10.000	-†	-†	0.0012 J	-	-	-	-
Methylene Chloride	0.005	0.380	-	-	-	-	-	-	-
Tetrachloroethene	0.005	0.055	0.0021	-	0.068	0.29	0.017	-	-
Toluene	1.000	20.000	-†	-†	-	-	0.00051 J	0.00035 J	-
1,1,1-Trichloroethane	0.200	29.000	-	-	-	-		-	-
Trichloroethene	0.005	0.050	-	-	-	-	0.0005 J	-	-
Cumulative CVOC Concentration			0.0021	0	0.068	0.29	0.01787	0.00035	

□ = Concentration exceeds RISC closure level for a residential setting

* = RISC Closure levels are derived from Table A within Appendix A of the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Technical Guide (July 24, 2001)

Trip Blank 2/27/04 shipped with groundwater samples OSP-1, OSP-2, OSP-3, OSP-4, OSP-5, OSP-6, OSP-13, IB-1, Pre PZ-10DS, Pre PZ-10DI, OSP-100

Trip Blank 4/7/04 was shipped with groundwater samples OSP-7, OSP-8, OSP-9, SPP-10, OSP-11, OSP-12, OSP-15, OSP-16, OSP-17

CVOC = Chlorinated volatile organic compounds

B = Constituent detected in Method Blank; J = Estimated value

† = Low level detections were reported for this sample and the associated Method Blank and/or Trip Blank. In accordance with the U.S. EPA Contract Laboratory Program National Functional Guidelines or Low Concentration Organic Data Review (2001). These detections were qualified as not detected above its respective reporting limit.

TABLE 4

ANALYTICAL RESULTS SUMMARY
GROUNDWATER SAMPLING - STAGE I FIELD ACTIVITIES
APRIL 6-8, 2004 EVENT
REMEDIAL INVESTIGATION - PHASE II

TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA

	RISC Closure Level*		Shallow Alluvial						
Parameters	Residential	Industrial	MW-3	MW-4	MW-5	MW-6	MW-7	MW-11	MW-11 DUP (MW-100)
TCL Volatile Organics (mg/L)									
Acetone	0.950	92.000	0.0036 J	-†	-†	-†	-	-†	-†
2-Butanone			-	-	-	-	-	-	-
cis-1,2-Dichloroethene	0.070	1.0	0.11	0.81	-	-	-	0.062 J	0.06 J
trans-1,2-Dichloroethene	0.100	2.0	-	-	-	-	-	-	-
Methylene choride	0.005	0.380	-†	-†	-	-	-†	-†	-
Tetrachloroethene	0.005	0.055	0.11	3.6	2.5	0.073	0.47	2.7	2.8
Trichloroethene	0.005	0.0072	0.013	0.35	-	-	-	0.026 J	0.024 J
Vinyl Chloride	0.002	0.002	0.0061	0.12	-	-	-	-	-
Cumulative CVOC Concentration			0.2391	4.88	2.5	0.073	0.47	2.788	2.884
Field Parameters									
Dissolved Oxygen (mg/L)			1.6	0.16	0.12	0.52	1.66	0.12	NA
Oxidation-Reduction Potential (mV)			182.3	-82.2	-9.5	89	121	88.4	NA
Specific Conductance (µmhos/cm)			894	1,106	998	1065	989	1030	NA
pH (S.I.)			7.99	7.47	7.59	7.4	7.95	7.76	NA
Temperature (Fahrenheit)			54.86	58.76	60.9	53.04	61.7	59.98	NA

"-" = Below detection limit; TCL = Target Compound List; "*" = Parameters collected from an unpreserved jar sample; NA = Not Analyzed

☐ = Concentration exceeds RISC closure level for a residential setting

* = RISC Closure levels are derived from Table A within Appendix A of the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Technical Guide (July 24, 2001)

† = Low level detections were reported for this sample and the associated Method Blank and/or Trip Blank. In accordance with the U.S. EPA Contract Laboratory Program National Functional Guidelines or Low Concentration Organic Data Review (2001). These detections were qualified as not detected above its respective reporting limit.

TABLE 4 (Continued)

Parameters	RISC Closure Level* Residential	RISC Closure Level* Industrial	Shallow Alluvial MW-13	MW-14	MW-14 DUP (MW-200)	MW-15	MW-16	RW-1
TCL Volatile Organics (mg/L)								
Acetone	0.950	92.000	-†	-	-	-†	-	-
2-Butanone			-	-	-	-	-	-
cis-1,2-Dichloroethene	0.070	1.0	0.26	0.041	0.053	-	-	0.12
trans-1,2-Dichloroethene	0.100	2.0	-	-	-	-	-	-
Methylene choride	0.005	0.380	-	-	-	-	-	-
Tetrachloroethene	0.005	0.055	2.20	1.00	0.97	0.082	0.011	1.90
Trichloroethene	0.005	0.0072	0.025 J	0.11	0.13	0.00091 J	0.00025 J	0.072
Vinyl Chloride	0.002	0.002	-	-	-	-	-	-
Cumulative CVOC Concentration			2.485	1.151	1.153	0.08291	0.01125	2.092
Field Parameters								
Dissolved Oxygen (mg/L)			0.17	0.06	NA	0.16	0.6	NA
Oxidation-Reduction Potential (mV)			18.2	-27.1	NA	46.3	93.4	NA
Specific Conductance (µmhos/cm)			1,112	1003	NA	949	816	NA
pH (S.I.)			7.92	7.54	NA	7.98	7.89	NA
Temperature (Fahrenheit)			56.38	56.98	NA	56.93	56.34	NA

"-" = Below detection limit; TCL = Target Compound List; "*" = Parameters collected from an unpreserved jar sample; NA = Not Analyzed

= Concentration exceeds RISC closure level for a residential setting

* = RISC Closure levels are derived from Table A within Appendix A of the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Technical Guide (July 24, 2001)

† = Low level detections were reported for this sample and the associated Method Blank and/or Trip Blank. In accordance with the U.S. EPA Contract Laboratory Program National Functional Guidelines or Low Concentration Organic Data Review (2001). These detections were qualified as not detected above its respective reporting limit.

TABLE 4 (Continued)

Parameters	RISC Closure Level* Residential	RISC Closure Level* Industrial	Middle Aquifer MW-4I	Middle Aquifer MW-6I	Middle Aquifer MW-13I	Middle Aquifer MW-14I	Deep Aquifer MW-4D	Deep Aquifer MW-6D	Trip Blank 4/7/04	Trip Blank 4/8/04
TCL Volatile Organics (mg/L)										
Acetone	0.950	92.000	-†	-†	-	-	-	-†	0.00074 J	-
2-Butanone			-	0.00071 J	-	-	-	-	-	-
cis-1,2-Dichloroethene	0.070	1.0	0.81	-	-	0.00045 J	0.00078 J	-	-	-
trans-1,2-Dichloroethene	0.100	2.0	-	-	-	-	-	-	-	-
Methylene choride	0.005	0.380	-†	-	-	-	-	-	-	-
Tetrachloroethene	0.005	0.055	4.7	-	-	-	0.0024	-	-	-
Trichloroethene	0.005	0.0072	1.3	-	-	-	0.0035	-	-	-
Vinyl Chloride	0.002	0.002	-	-	-	-	-	-	-	-
Cumulative CVOC Concentration			6.81	-	-	0.00045	0.00668	-		
Field Parameters										
Dissolved Oxygen (mg/L)			0.28	0.12	0.06	0.07	0.04	0.08		
Oxidation-Reduction Potential (mV)			-105.9	-123.8	-105.4	-74.1	-132	-28.5		
Specific Conductance (µmhos/cm)			848	840	725	646	775	1,088		
pH (S.I.)			7.7	7.67	7.83	7.77	7.71	6.24		
Temperature (Fahrenheit)			60.4	58.04	60.6	60.42	58.05	57.75		

"-" = Below detection limit; TCL = Target Compound List; "*" = Parameters collected from an unpreserved jar sample; NA = Not Analyzed

☐ = Concentration exceeds RISC closure level for a residential setting

* = RISC Closure levels are derived from Table A within Appendix A of the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Technical Guide (July 24, 2001)

† = Low level detections were reported for this sample and the associated Method Blank and/or Trip Blank. In accordance with the U.S. EPA Contract Laboratory Program National Functional Guidelines or Low Concentration Organic Data Review (2001). These detections were qualified as not detected above its respective reporting limit.

TABLE 5

GROUNDWATER DRAWDOWN EVALUATION - RW-1 PUMP TEST
STAGE I FIELD ACTIVITIES
REMEDIAL INVESTIGATION - PHASE II

TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA

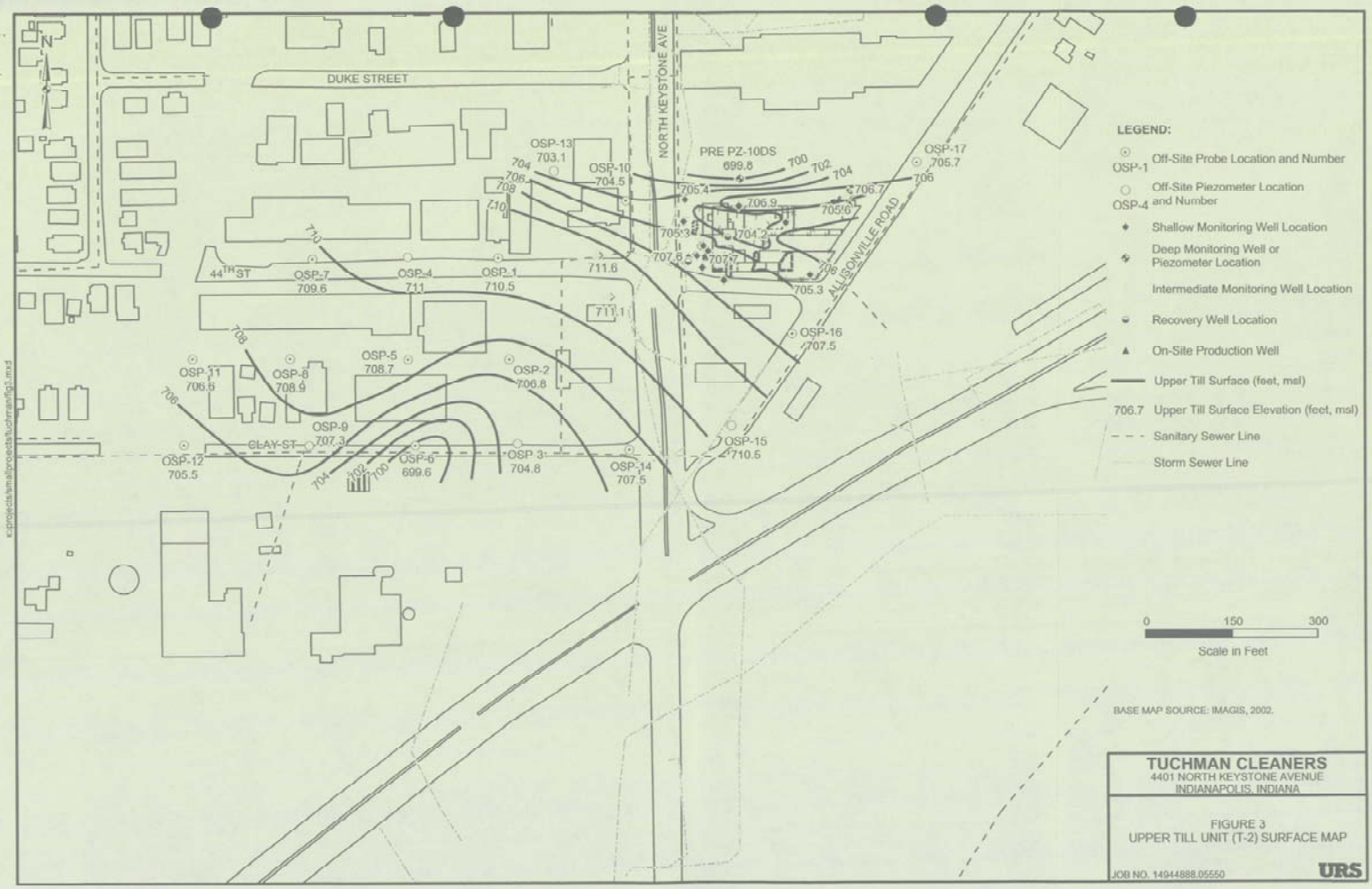
		3/22/2004 - RW-1 Pump Test		
Well No.	Reference Elevation* (feet)	Static Groundwater Elevation (feet)	Pump Induced Groundwater Elevation (feet)	Drawdown Due to Pumping* (feet)
MW-1	728.16	717.45	717.36	0.09
MW-3	727.2	717.52	717.46	0.06
MW-4	727.71	717.46	NM	NA
MW-4I	727.55	715.75	NM	NA
MW-4D	727.56	712.11	NM	NA
MW-5	727.84	717.41	717.25	0.16
MW-6	728.33	717.92	717.94	-0.02
MW-6I	728.22	713.6	NM	NA
MW-6D	728.2	712.15	NM	NA
MW-7	728.22	717.53	717.48	0.05
MW-8	727.87	717.48	717.41	0.07
MW-9	727.81	717.4	717.11	0.29
MW-10	728.56	717.59	717.58	0.01
MW-11	727.49	717.33	717.28	0.05
MW-12	728.08	717.3	NM	NA
MW-13	729.05	716.43	716.44	-0.01
MW-13I	729.05	716.02	NM	NA
MW-14	728.4	716.45	716.54	-0.09
MW-15	728.43	717.71	717.69	0.02
MW-17	727.88	717.31	NM	NA
OSP-3	727.37	715.26	715.29	-0.03
OSP-4	737.21	715.16	715.15	0.01
OSP-13	731.37	716.39	716.42	-0.03

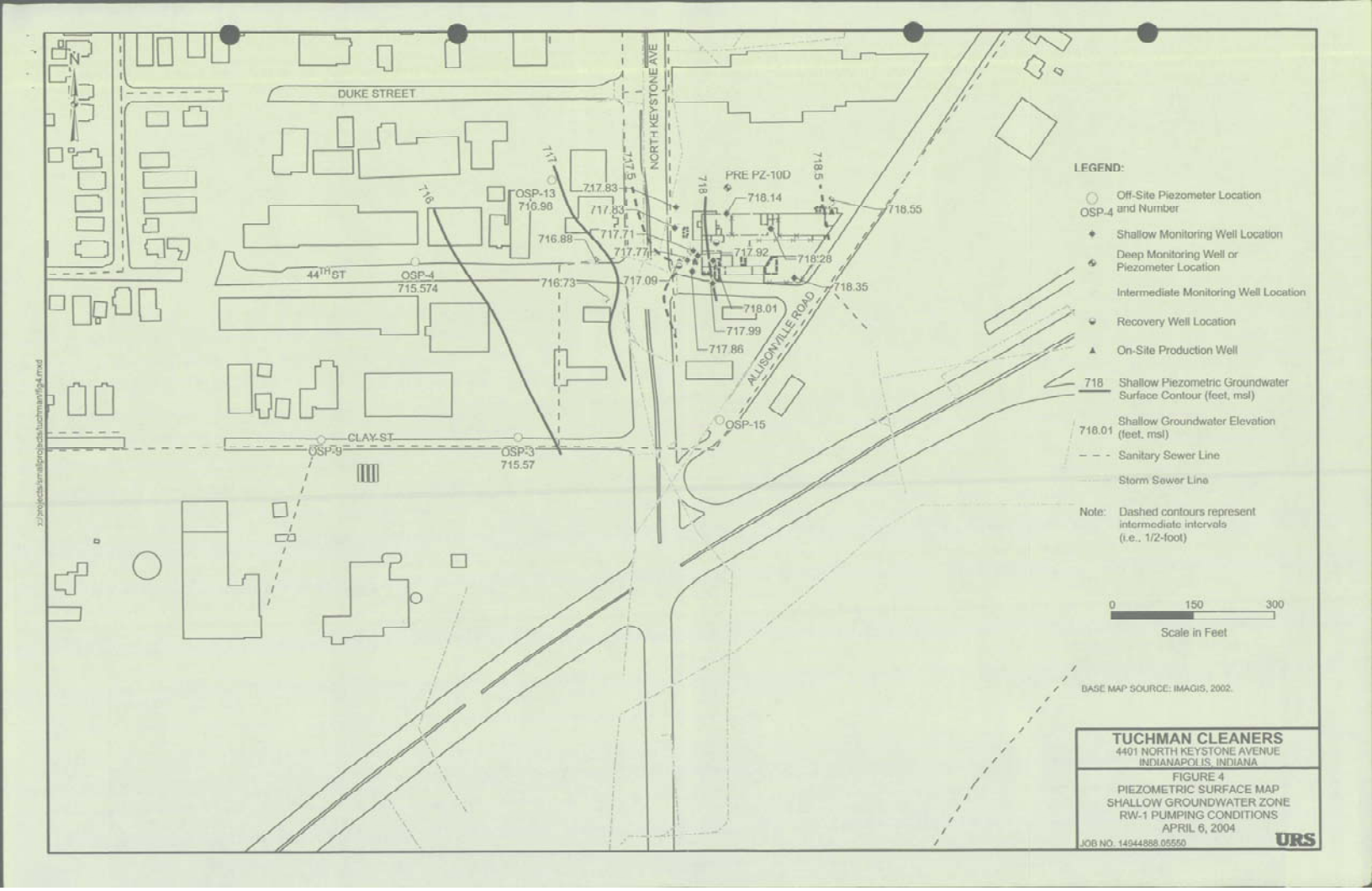
* Monitoring wells were surveyed on February 20-26, 2003 and April 21, 2004 by Beacon Engineering of Indianapolis, IN. Reference elevations are relative to NAD 27 sea level datum.

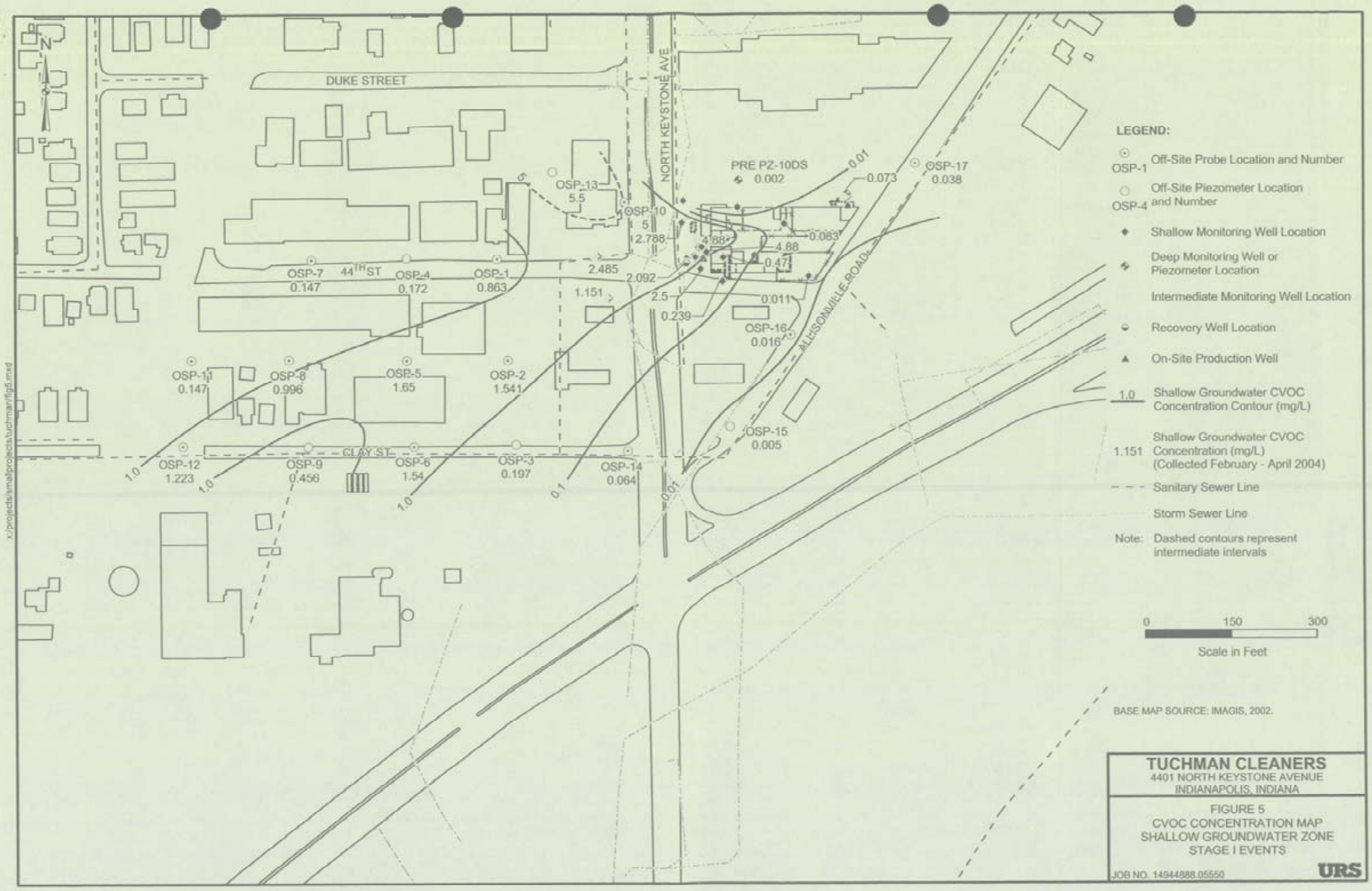
** Negative values reflect a rise in groundwater elevation since pumping began.

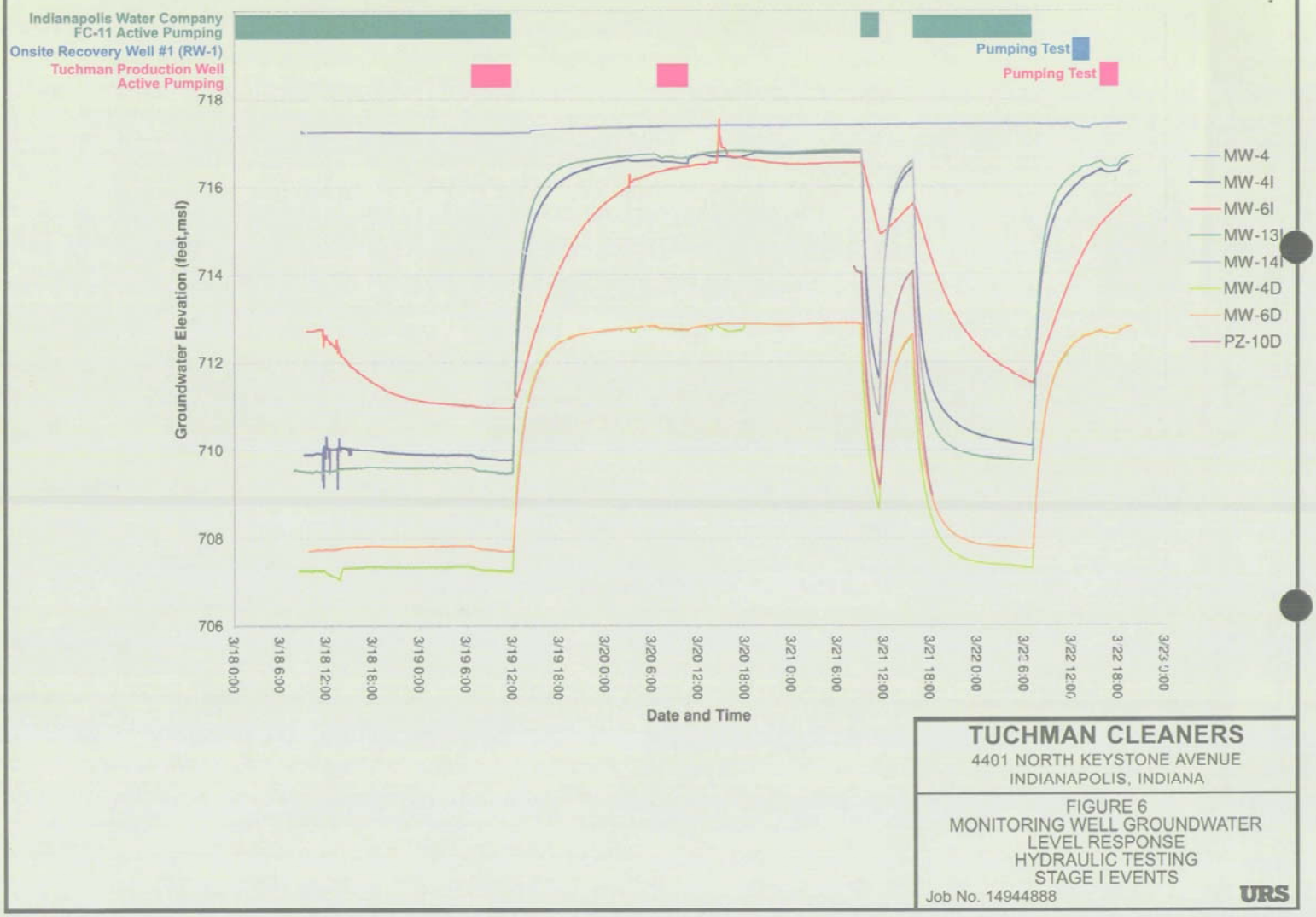
NA = Drawdown Difference value not available
NM = Not Measured


N
BLUFF STREET
NORTH KEYSTONE AVE
ALLISONVILLE ROAD
4TH ST
CLAY ST
OSP-1
OSP-2
OSP-3
OSP-4
OSP-5
OSP-6
OSP-7
OSP-8
OSP-9
OSP-10
OSP-11
OSP-12
OSP-13
OSP-14
OSP-15
OSP-16
OSP-17
PZ-10D
LEGEND:
Off-Site Probe Location and Number
Off-Site Piezometer Location and Number
Shallow Monitoring Well Location
Deep Monitoring Well or Piezometer Location
Intermediate Monitoring Well Location
Recovery Well Location
On-Site Production Well
Sanitary Sewer Line
Storm Sewer Line
Parcel Boundary
0
250
500
Scale in Feet
BASE MAP SOURCE: IMAGIS Aerial Photography, 2002.
TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA
FIGURE 1
SITE VICINITY MAP SHOWING PROBE, PIEZOMETER, AND WELL LOCATIONS
JOB NO. 14944888.05350
URS


N
DUKE STREET
NORTH KEYSTONE AVE
ALLISONVILLE ROAD
44TH ST
CLAY ST
OSP-13
703.1
OSP-10
704.5
PRE PZ-10DS
699.8
OSP-17
705.7
OSP-7
709.6
OSP-4
711
OSP-1
710.5
711.6
711.1
OSP-16
707.5
OSP-11
706.6
OSP-8
708.9
OSP-5
708.7
OSP-2
706.8
OSP-9
707.3
OSP-12
705.5
OSP-6
699.6
OSP 3
704.8
OSP-14
707.5
OSP-15
710.5
705.3
LEGEND:
Off-Site Probe Location and Number
OSP-1
Off-Site Piezometer Location and Number
OSP-4
Shallow Monitoring Well Location
Deep Monitoring Well or Piezometer Location
Intermediate Monitoring Well Location
Recovery Well Location
On-Site Production Well
Upper Till Surface (feet, msl)
706.7 Upper Till Surface Elevation (feet, msl)
Sanitary Sewer Line
Storm Sewer Line
0
150
300
Scale in Feet
BASE MAP SOURCE: IMAGIS, 2002.
TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA
FIGURE 3
UPPER TILL UNIT (T-2) SURFACE MAP
JOB NO. 14944888.05550
URS


N
DUKE STREET
NORTH KEYSTONE AVE
44TH ST
CLAY ST
ALLISONVILLE ROAD
OSP-13
716.96
OSP-4
715.574
OSP-9
OSP-3
715.57
OSP-15
PRE PZ-10D
717.83
717.83
717.71
717.77
716.88
716.73
717.09
717.92
718.14
718.28
718.55
718.35
718.01
717.99
717.86
LEGEND:
Off-Site Piezometer Location and Number
OSP-4
Shallow Monitoring Well Location
Deep Monitoring Well or Piezometer Location
Intermediate Monitoring Well Location
Recovery Well Location
On-Site Production Well
718
Shallow Piezometric Groundwater Surface Contour (feet, msl)
718.01
Shallow Groundwater Elevation (feet, msl)
Sanitary Sewer Line
Storm Sewer Line
Note: Dashed contours represent intermediate intervals (i.e., 1/2-foot)
0
150
300
Scale in Feet
BASE MAP SOURCE: IMAGIS, 2002.
TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA
FIGURE 4
PIEZOMETRIC SURFACE MAP
SHALLOW GROUNDWATER ZONE
RW-1 PUMPING CONDITIONS
APRIL 6, 2004
JOB NO. 14044888.05550
URS
z:/projects/smallprojects/tuchman/fig4.mxd


DUKE STREET
NORTH KEYSTONE AVE
44TH ST
CLAY ST
ALLISONVILLE ROAD
PRE PZ-10DS
0.002
OSP-17
0.038
0.073
0.01
OSP-13
5.5
OSP-10
5
2.788
4.88
4.88
0.083
0.47
2.485
2.092
2.5
1.151
0.239
0.011
OSP-16
0.016
OSP-7
0.147
OSP-4
0.172
OSP-1
0.863
OSP-11
0.147
OSP-8
0.996
OSP-5
1.65
OSP-2
1.541
OSP-15
0.005
OSP-12
1.223
OSP-9
0.456
OSP-6
1.54
OSP-3
0.197
OSP-14
0.064
1.0
0.1
0.01
LEGEND:
OSP-1 Off-Site Probe Location and Number
OSP-4 Off-Site Piezometer Location and Number
Shallow Monitoring Well Location
Deep Monitoring Well or Piezometer Location
Intermediate Monitoring Well Location
Recovery Well Location
On-Site Production Well
1.0 Shallow Groundwater CVOC Concentration Contour (mg/L)
1.151 Shallow Groundwater CVOC Concentration (mg/L) (Collected February - April 2004)
Sanitary Sewer Line
Storm Sewer Line
Note: Dashed contours represent intermediate intervals
0 150 300
Scale in Feet
BASE MAP SOURCE: IMAGIS, 2002.
TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA
FIGURE 5
CVOC CONCENTRATION MAP
SHALLOW GROUNDWATER ZONE
STAGE I EVENTS
JOB NO. 14944888.05550
URS



TUCHMAN CLEANERS
4401 NORTH KEYSTONE AVENUE
INDIANAPOLIS, INDIANA

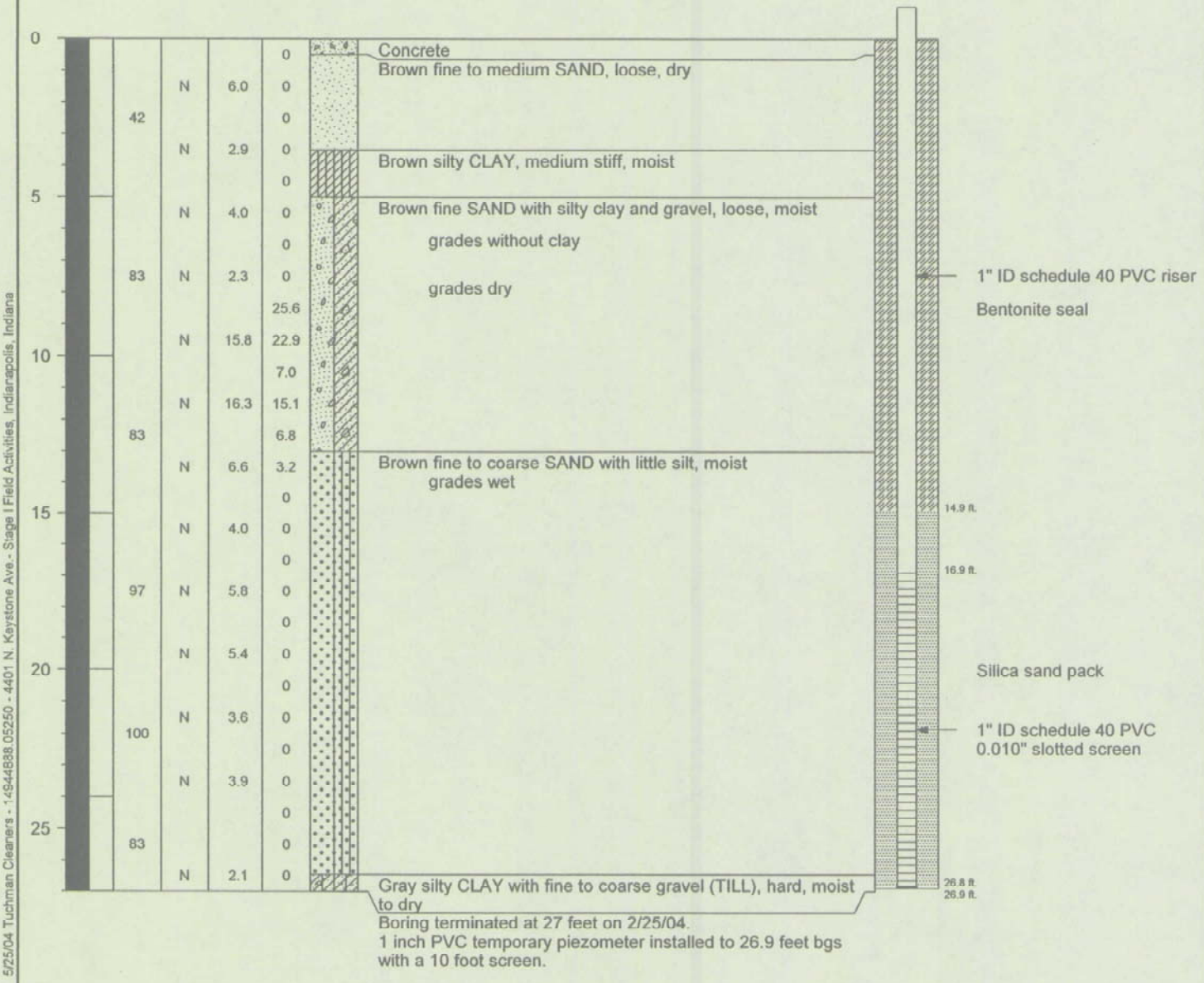
FIGURE 6
MONITORING WELL GROUNDWATER LEVEL RESPONSE
HYDRAULIC TESTING
STAGE I EVENTS

Job No. 14944888

URS

APPENDIX A

BORING LOGS



LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

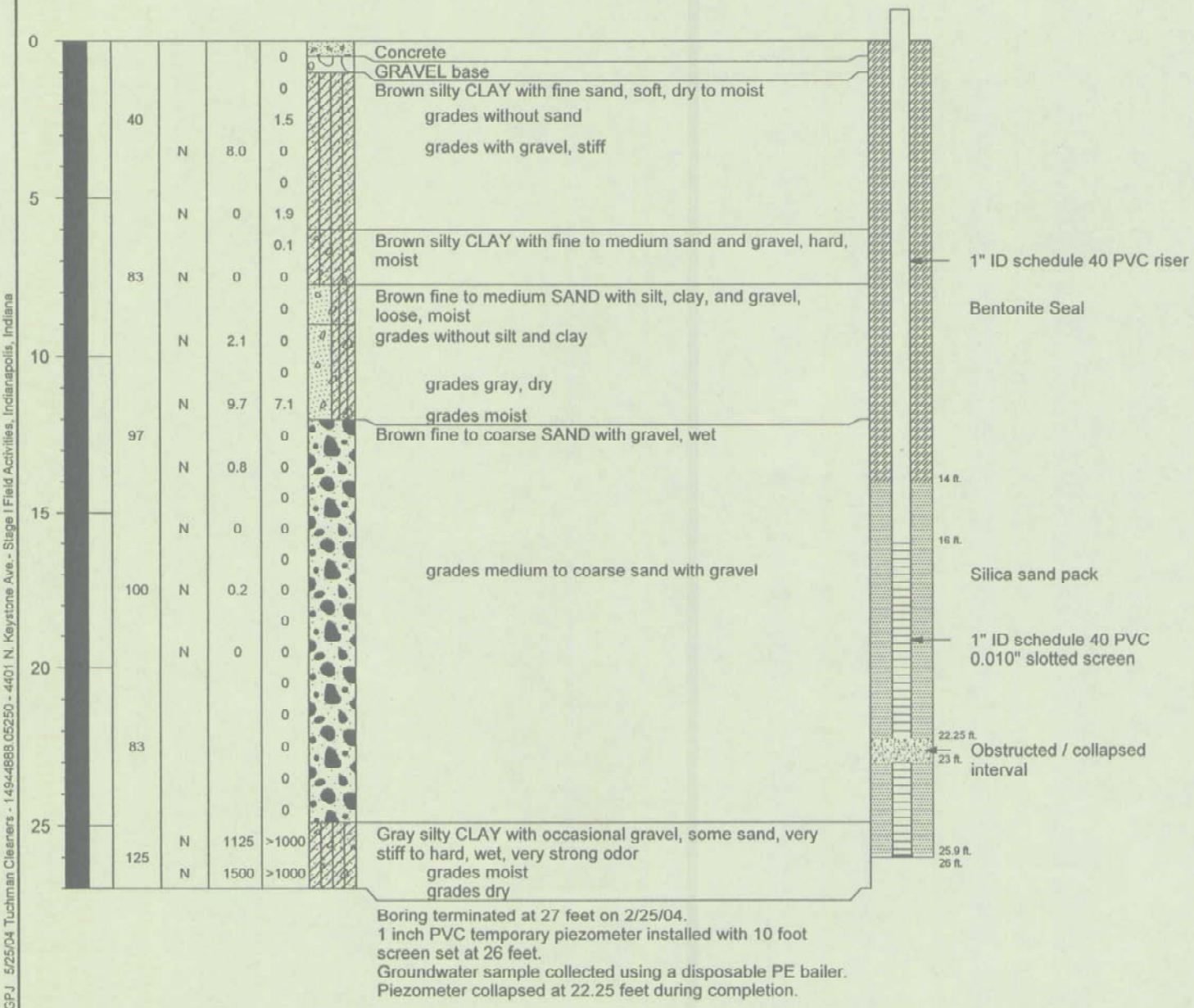
URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER IB-1



Boring terminated at 27 feet on 2/25/04.
1 inch PVC temporary piezometer installed with 10 foot screen set at 26 feet.
Groundwater sample collected using a disposable PE bailer.
Piezometer collapsed at 22.25 feet during completion.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER IB-2

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	PIEZOMETER CONSTRUCTION DETAIL
0					0		CONCRETE	
					0		Subfloor GRAVEL and CRUSHED ROCK (BASE)	
			N	0	0		Brown silty CLAY with medium sand and gravel, stiff, moist	
		80			0			
			N	0	0		grades grayish brown	
					0			
5			N	0	0			
					0		grades with gravel and crushed rock fragments	1" ID schedule 40 PVC riser
		83	N	0	0		grades with medium sand	
					0			
			N	0	0		Brown fine to medium SAND with silt and gravel, loose, moist	
10					0			Bentonite Seal
			N	1.9	0			
		60			0			
			N	0	0		grades dry grades moist grades light brown, wet	13.5 ft.
					0		grades dark brown	
15			N	0	0		Brown fine to coarse SAND with gravel, wet	15.5 ft.
					0			Silica sand pack
		100	N	0	0			
					0		grades without fine sand	
			N	0	0			
20					0			1" ID schedule 40 PVC 0.010" slotted screen
		67	N	0	0			
					0			
			N	0	0			
		67			0			
25			N	0	0			25.4 ft. 25.5 ft.
							Blue gray silty CLAY with sand and gravel, hard to stiff, moist (TILL)	

Boring terminated at 26 feet on 2/26/04.
1 inch PVC temporary piezometer installed to 25.5 feet bgs with a 10 foot screen.
Groundwater sample collected using a disposable PE bailer.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave. - Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER IB-3

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT
			N	0	0		GRAVEL base
		48			0		Brown fine to coarse SAND with gravel, loose, moist
			N	0	0		
					0		
5			N	0	0		grades medium without gravel
					0		grades fine to coarse
		83	N	0	0		
					0		
			N	0	0		
10					0		
			N	0	0		
		75			0		
			N	0	0		Orangish brown silty fine to coarse SAND with gravel, dense
					0		
15			N	0	0		Brownish gray fine to coarse SAND with gravel, moist
					0		
		100	N	0	0		grades more brown, wet
					0		
			N	0	0		grades fine to coarse sand and gravel
20					0		
			N	0	0		
		67			0		
			N	0	0		Gray silty CLAY with gravel, very stiff to hard, moist
25					0		

Boring terminated at 25 feet bgs on 2/26/04.
4 foot screen point driven to 24 feet bgs and and protective casing retracted to 20 feet bgs to allow groundwater to flow through the screen.
Groundwater sample collected from disposable tubing with check valve attached at the base of the tubing.
Screen point removed after sampling and boring backfilled with bentonite on 2/26/04.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

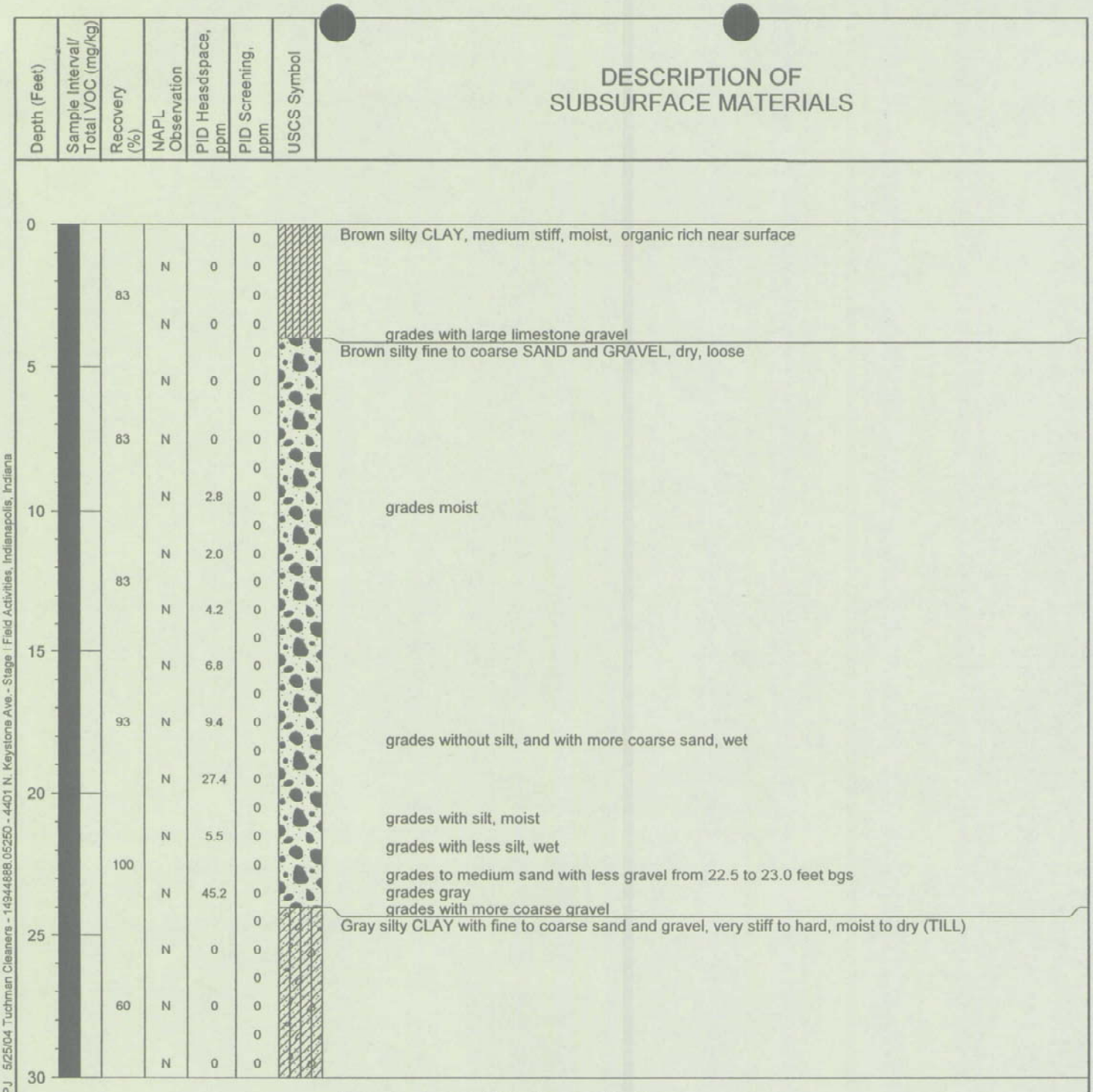
URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER
OSP-1



Boring terminated at 30 feet bgs on 2/25/04.
1 inch diameter PVC temporary piezometer installed to 25 feet bgs with a 5 foot screen.
Groundwater sample was collected using a disposable polyethylene (PE) bailer.
Temporary piezometer removed and boring backfilled with bentonite on 2/25/04.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-2

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	PIEZOMETER CONSTRUCTION DETAIL
0					0		ASPHALT and GRAVEL base	0 ft. 0.5 ft. 1 ft. Flush mounted casing with locking cap
			N	0	0		Blackish brown silty CLAY with occasional sand and gravel, stiff, moist	
		70			0		grades brown	
			N	0	0			Bentonite-cement grout
5					0			1" ID schedule 40 PVC riser
			N	0	0		grades to dark grayish-brown	
					0		grades with more silt and less sand	
		100	N	0	0			7.3 ft. Bentonite Seal
					0		grades with brown mottling between 9 and 10 feet bgs	
10			N	0	0			9.3 ft.
					0		Grayish brown silty fine to medium SAND with gravel, wet, soft	11.3 ft.
		60			0			
			N	0	0		grades with medium to coarse sand	
15					0			Silica sand pack
			N	0	0		Brown fine to coarse SAND with gravel, wet	
					0			1" ID schedule 40 PVC 0.010" slotted screen
		100	N	0	0			
					0			
20			N	0	0			
					0			
			N	0	0			
		100			0		grades yellowish-brown (iron staining) from 22.5 to 22.75 feet bgs	21.2 ft. 21.3 ft.
			N	0	0		Blue silty CLAY with little sand and occassional gravel (TILL), hard, moist to dry	
25					0		4 inch gray sand and gravel layer	

Boring terminated at 25 feet on 2/26/04.
Piezometer installed to 21.3 feet bgs with a 10 foot screen.
Groundwater sample collected using a disposable PE bailer.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-3

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	PIEZOMETER CONSTRUCTION DETAIL
0					0		ASPHALT	
			N	0	0		Dark brown silty CLAY with fine to medium sand and gravel, stiff	
		83			0			
			N	0	0			
5					0		Light brown fine to coarse SAND with gravel, silt and clay, moist	
			N	0	0			Bentonite and cement grout
					0		Light brown fine to medium sand, moist	
		83	N	0	0			
					0			1" ID schedule 40 PVC riser
10			N	0	0			
					0			
			N	0	0			
		83			0			12.4 ft. Bentonite Seal
			N	0	0			14.4 ft.
15					0			
			N	0	0			16.4 ft.
					0			
		NA	N	3.5	0		grades with silt from 17.5 to 18.5 feet bgs	
					0			
			N	0	0		grades with occasional fine gravel	
20					0		grades with more gravel	Silica sand pack
			N	0	0			1" ID schedule 40 0.010" slotted screen
		NA			0		grades orangish brown, grades wet	
			N	0	0			
					0			
25			N	0	0			
		NA			0		Gray silty CLAY with gravel (TILL), stiff, moist to dry	26.3 ft. 26.4 ft.
			N	0	0			

Boring terminated at 28 feet on 2/27/04.
Piezometer installed to 26.4 feet bgs with a 10 foot screen.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

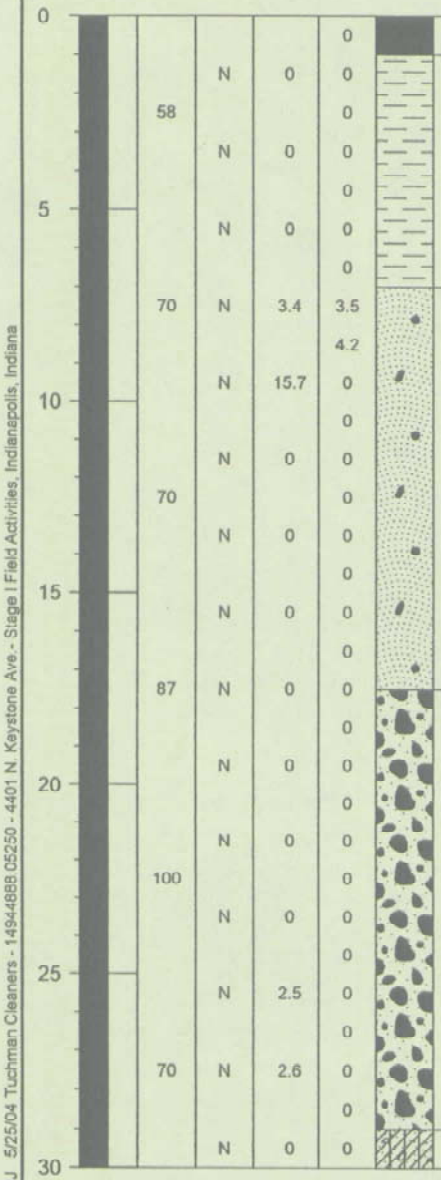
URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-4



Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT and GRAVEL base
			N	0	0		Dark brown clayey SILT, moist, soft
		58			0		grades brown, stiff to hard
			N	0	0		
5					0		
			N	0	0		
					0		grades with sand
		70	N	3.4	3.5		Brown fine to medium SAND with occasional gravel, loose, moist
					4.2		
			N	15.7	0		
10					0		
			N	0	0		
		70			0		
			N	0	0		grades without gravel from 13.5 to 14.5 feet bgs
					0		
15			N	0	0		
					0		
		87	N	0	0		Brown fine to coarse SAND and GRAVEL, moist, brown
					0		
			N	0	0		
20					0		
			N	0	0		
		100			0		
			N	0	0		
					0		grades wet
25			N	2.5	0		
					0		
		70	N	2.6	0		
					0		
			N	0	0		Gray silty CLAY, stiff to hard, moist (TILL)
30							

Boring terminated at 30 feet on 2/26/04.
1 inch ID PVC temporary piezometer installed to 29 feet with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 2/26/04.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-5

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				NR	0		ASPHALT
							Dark gray sity fine SAND
			N	0	0		Dark brown silty CLAY with fine to coarse sand with gravel, stiff, moist
		50		NR	0		Brown medium SAND with occasional gravel, loose, moist
			N	0	0		
				NR	0		
5			N	0	0		
					0		grades with an 1-inch dark gray seam
					0		grades with an 1-inch light brown sand seam
		60	N	0	0		
					0		grades with coarse sand
							Brown medium to coarse SAND, loose, moist
			N	0	0		Brown fine to coarse SAND, loose, moist
10					0		grades with gravel
			N	0	0		grades with silt
		75			0		
			N	0	0		
					0		
15			N	0	0		
					0		
		100	N	0	0		grades with more gravel
					0		
			N	0	0		
20					0		
			N	4.7	0		
		100			0		grades wet with a 4-inch gravel layer
			N	5.7	0		grades yellowish brown (iron staining)
					0		
25			N	12	0		Brown fine to medium SAND, occasional gravel, loose, wet
					0		
		83	N	7.0	0		
					0		grades with silt, medium dense, moist
			N	5	0		grades loose
30					0		
			N	13.7	0		
		100			0		
			N	0	0		
35					0		

Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER
OSP-6

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
							Gray silty CLAY with occasional gravel (TILL) moist

Boring terminated at 35 feet on 2/26/04.
1 inch diameter PVC temporary piezometer to 30 feet bgs installed with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 2/26/04.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-6

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT and GRAVEL base
			N	0	0		Brown clayey SILT, soft, moist
		80			0		grades with occasional sand
			N	0	0		grades with more clay, stiff
5					0		
			N	0/1.7*	0		grades medium stiff
		53	N	0	0		
					0		Brown fine to medium SAND with occasional coarse sand and gravel, moist
			N	0	0		
10					0		
			N	0	0		
		80			0		Brown fine to medium SAND, moist
			N	0	0		
					0		grades fine
15			N	0	0		
					0		
		67	N	0	0		
					0		
			N	0	0		
20					0		
			N	0/14.9*	0		
		77			0		
			N	0/10.1*	0		Brown fine to medium SAND with gravel, wet
					0		grades orangish-brown (iron staining) from 24.5 to 25.8 feet bgs
25			N	0/22.6*	0		
					0		grades with more coarse sand and gravel
		100	N	0/21.4*	0		
					0		Bluish gray silty CLAY with occasional sand and gravel, stiff, moist
30			N	0/58.4*	0		

Boring terminated at 30 feet on 4/8/04.
1 inch PVC temporary piezometer installed to 30 feet bgs with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/8/04.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944868.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-7

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT and GRAVEL base
					0		Brown silty CLAY, stiff, moist
		83	N	0/35.6*	0		
			N	0/34.1*	0		
5					0		Light brown fine to medium SAND with occasional coarse sand and gravel, loose, dry to moist
			N	0/7.9*	0		
		80			0		
10			N	0	0		
			N	0	0		
		77			0		
			N	0	0		
15			N	0	0		
		80			0		
			N	0	0		
20			N	0	0		
		60			0		
			N	0/1.8*	0		
					0		grades wet
25					0		Brown coarse SAND with gravel and medium sand, wet
			N	0/4.6*	0		
		60			0		
					0		grades orangish brown (iron-staining)
					0		Gray fine to medium SAND with fine gravel and occasional coarse sand, wet
30			N	0	0		
		100			0		Bluish gray silty CLAY with occasional gravel, moist, very stiff

Boring terminated at 32 feet on 4/8/04.
1 inch PVC temporary piezometer installed to 32 feet bgs with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/8/04.

Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER
OSP-8

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Heasdspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS

*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-8

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT
			N	0/85.3*	0		Brown fine to medium SAND with occasional coarse sand, moist
		53			0		grades with brown clay and silt from 2.0 to 2.3 feet bgs
			N	0/35.0*	0		grades to a brown clayey silt with sand from 3.5 to 3.8 feet bgs
5			N	0	0		Brown fine to medium SAND with occasional coarse sand and gravel, moist
		47	N	0	0		grades with medium to coarse gravel from 6.5 to 8.0 feet bgs
			N	0	0		
10			N	0	0		
		75	N	0	0		
			N	0	0		
					0.6		
15			N	0	0		grades to a fine sand seam without gravel from 14.5 to 15.0 feet bgs
		73	N	0	0		
			N	0	0		
20			N	0	0		
		60	N	0	0		
			N	0	0		grades wet
25			N	0	0		
		67	N	0	0		
			N	0	0		
30					0		
		100			0		Blueish gray silty CLAY with sand and gravel (TILL), very stiff, moist

Boring terminated at 32 feet on 4/7/04.
1 inch PVC temporary piezometer installed to 32 feet bgs with a 10 foot screen.

PIEZOMETER CONSTRUCTION DETAIL

Bentonite and cement grout

1" ID schedule 40 PVC riser

17.9 ft.

Bentonite Seal

19.9 ft.

21.9 ft.

Silica sand pack

1" ID schedule 40 PVC 0.010" slotted screen

31.9 ft.
32 ft.

Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave. - Stage I Field Activities; Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-9

Depth (Feet) -	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	PIEZOMETER CONSTRUCTION DETAIL

Groundwater sample collected using a disposable PE bailer.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

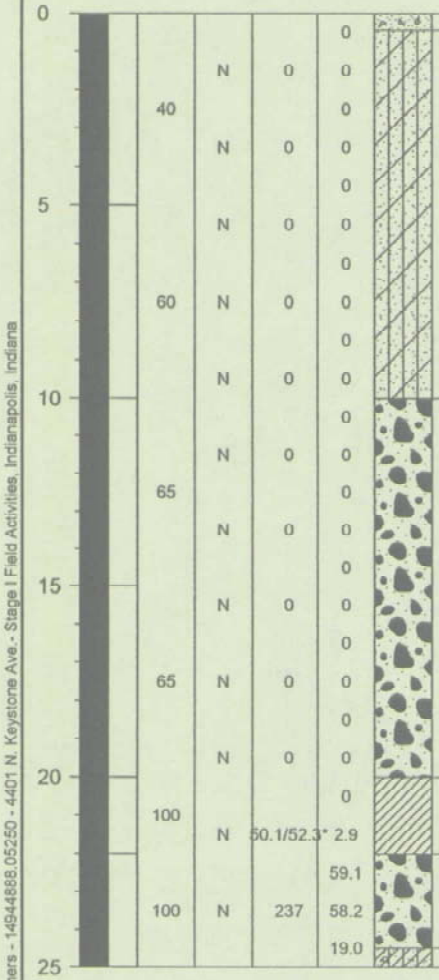
URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-9



DESCRIPTION OF SUBSURFACE MATERIALS

CONCRETE and GRAVEL base

Brown clayey SILT with occasional sand and fine gravel, moist, soft to medium stiff

grades with fine sand

Brown fine to coarse SAND with silt and gravel, moist

grades orangeish-brown (iron staining) from 10.2 to 10.4 feet bgs

grades wet

grades without fine sand and silt from 14.5 to 15.5 feet bgs

grades gray

Bluish gray silty CLAY

Brown medium SAND with occasional sand and gravel, loose, wet

Bluish gray silty CLAY with fine to coarse sand and gravel (TILL), very stiff, moist to dry

Boring terminated at 25 feet on 4/8/04.
1 inch PVC temporary piezometer installed to 25 feet bgs with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/8/04.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

URS

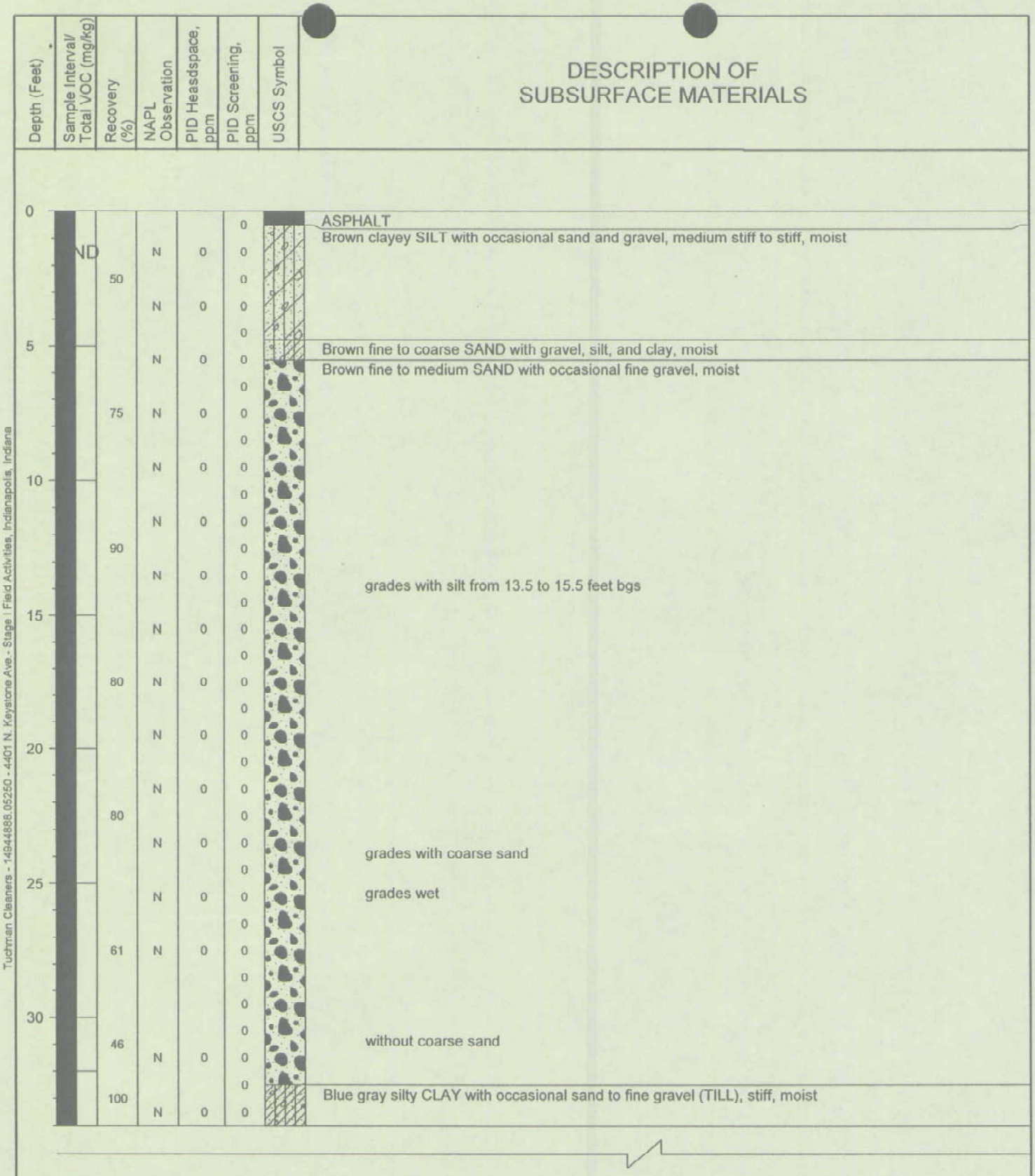
JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-10

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana



Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-11

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS

Boring terminated at 34 feet on 4/7/04.
1 inch PVC temporary piezometer installed to 34 feet bgs with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/7/04.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER
OSP-11

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT
			N	0	0		Brown fine to medium SAND with silt, organics, moist
		27			0		Brown silty CLAY with sand
					0		
5					0		3 inches of recovery due to fragment of concrete or rock
		5			0		
					0		
10					0		Brown fine to coarse SAND with gravel, moist
			N	0/38.9*	0		
		68			0		
			N	0/30.1*	0		
15			N	0/15.1*	0		
					0		
		70	N	0/16.9*	0		
					0		
			N	1.8/26.3*	0		grades orangish-brown (iron staining) from 19.0 to 20.0 feet bgs
20			N	0/20.3*	0		
		72			0		
			N	0/20.5*	0		
					0		grades orangish-brown (iron staining) from 24.0 to 25.0 feet bgs
25			N	0/8.8*	0		
					0		
		83	N	2.1/11.1*	0		Gray SILT, pliable, soft, wet
					0		
			N	0/15.4*	0		grades brown with fine sand and gravel
30					0		Brown medium SAND, wet
			N	0/27.2*	0		grades with gravel
		100			0		grades gray with coarse sand
			N	0/15.8*	0		Bluish gray silty CLAY with occasional sand and gravel (TILL), hard, moist
35					0		

Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-12

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS

Boring terminated at 35 feet on 4/7/04.
1 inch ID PVC temporary piezometer installed to 35 feet bgs with 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/7/04.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-12

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT with GRAVEL base
			N	0	0		Brown clayey SILT with sand and gravel, soft to stiff, moist
		30					
			N	0	0		
5			N	0	0		Brown fine SAND, loose, moist
		50	N	0	0		
			N	0	0		
10			N	0	0		grades with occasional gravel
		83					
			N	0	0		
15			N	0	0		grades wet
		92	N	0	0		
							grades yellowish brown to reddish-brown (iron-staining) from 18.0 to 18.8 feet bgs
20			N	0	0		
			N	0	0		Brown fine to coarse SAND with gravel, loose, wet
		100					
			N	0	0		
25			N	0	0		
		100	N	0	0		grades grayish brown
			N	0	0		Gray silty CLAY with gravel (TILL), stiff, moist
30							

PIEZOMETER CONSTRUCTION DETAIL

Bentonite and cement grout

1" ID schedule 40 PVC riser

15.9 ft.

Bentonite Seal

17.9 ft.

19.9 ft.

Silica sand pack

1" ID schedule 40 PVC 0.010" slotted screen

29.9 ft.

30 ft.

Boring terminated at 30 feet on 2/27/04.
Piezometer installed to 30 feet bgs with a 10 foot screen.
Groundwater sample collected using a disposable PE bailer.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave. - Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-13

DESCRIPTION OF SUBSURFACE MATERIALS

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					5.2		ASPHALT and base
			N	7.6/51.6*	0		
		100			0		
			N	0/21.3*	0		Brown clayey SILT with occasional sand and gravel, stiff, moist
					0		grades gray with brown mottling
5			N	0	0		
					0		grades with more fine to medium sand
		97	N	0	0		
					0		
			N	0	0		Brown fine to medium SAND with silt, clay, gravel
10					0		grades without clay and trace gravel
			N	0	0		grades without silt
							grades wet
		50			0		
			N	0	0		
					0		grades dark gray from 14.0 to 14.5 feet bgs
15	ND		N	2.0/7.5*	0		
					0		grades with silt from 16.0 to 16.5 feet bgs
		70	N	4.0/20.9*	0		grades brown
					0		
			N	0	0		
20					0		
		83	N	0	0		Bluish gray silty CLAY with occasional sand and gravel (TILL), very stiff, moist
					0		

Boring terminated at 23 feet on 4/8/04.
1 inch ID PVC temporary piezometer installed to 23 feet bgs with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/8/04.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

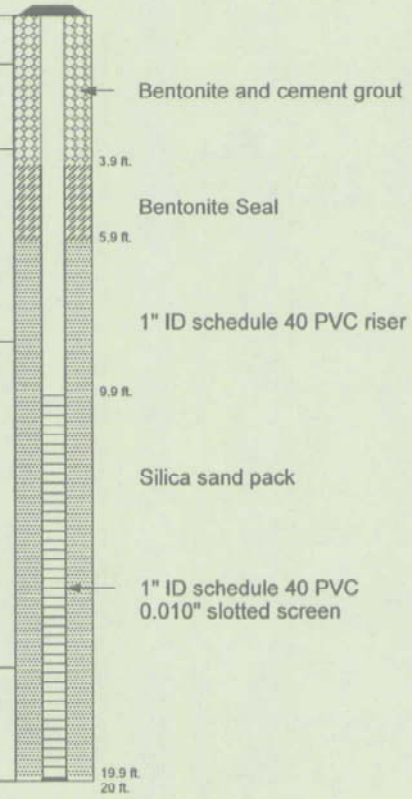
Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-14

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		Black ASPHALT with GRAVEL base
			N	0	0		Brown fine SAND with silt and gravel, moist
		67			0		
			N	0/6.1*	0		Brown silty CLAY with fine sand, stiff, moist
					0		grades with black mottling
5			N	0/3.5*	0		
					0		grades with occasional medium sand
		72	N	0/10.1*	0		grades with occasional fine to medium gravel
					0		
			N	0/13.1*	0		Brown fine to medium SAND with fine to medium gravel and silt, moist
10					0		
			N	0/10.1*	0		grades with more medium sand
		70			0		grades without silt
			N	0/11.7*	0		grades wet
					0		grades dark gray from 13.5 to 13.75 feet bgs
15			N	0/10.4*	0		
					0		grades orange-brown (iron-staining)
		82	N	0/17.4*	0		Bluish gray silty CLAY, with occasional sand and gravel (TILL), stiff, moist
					0		
20			N	0	0		

PIEZOMETER CONSTRUCTION DETAIL



Boring terminated at 20 feet on 4/6/04.
Temporary piezometer installed to 20 feet with a 10 foot screen.
Groundwater sample collected using a disposable PE bailer.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-15

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					0		ASPHALT and GRAVEL base
			N	0/87.9*	0		Grayish brown silty CLAY with occasional sand and gravel, medium stiff, moist
		87			0		
	ND		N	0/91.7*	0		grades dark brown
5			N	0/49.7*	0		
					0		
		88	N	0/55.4*	0		grades soft
					0		grades with coarse sand
			N	0/97.4*	0		
10					0		Brown fine to medium SAND with fine gravel, moist to wet.
			N	0/194*	0		grades wet
							Brown fine to medium GRAVEL with fine sand and silt, wet
		57			0		Brownish gray fine to medium SAND with occasional gravel, wet
			N	0/116*	0		grades without gravel
					0		
15			N	0/92.4*	0		
					0		
		100	N	0/50.5*	0		grades with medium to coarse sand
					0		grades with fine to medium gravel
			N	0/78.2*	0		
20					0		
		100			0		Bluish gray silty CLAY with occasional gravel and sand (TILL), stiff, moist
			N	0/57.0*	0		

Boring terminated at 21.5 feet on 4/6/04.
1 inch PVC temporary piezometer installed to 21.5 feet bgs with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/6/04.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

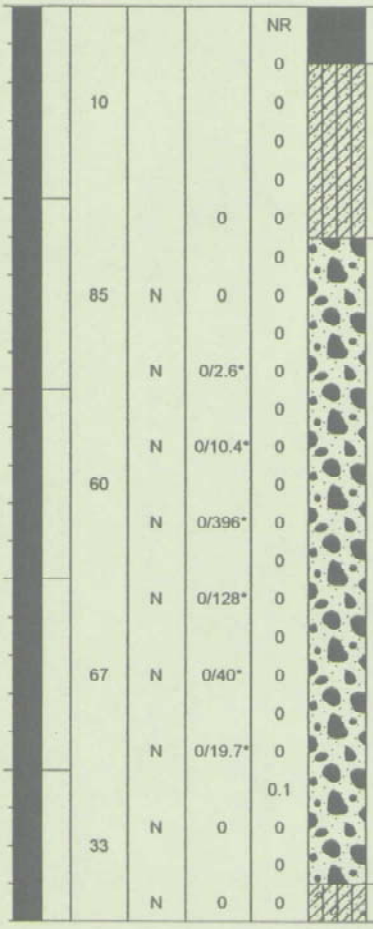
URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-16



Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0					NR		ASPHALT and CONCRETE
					0		Brown silty CLAY with occasional coarse sand with gravel, stiff, moist
		10			0		
					0		
					0		
5				0	0		
					0		Brown to tan fine to coarse SAND and GRAVEL, dry to moist
		85	N	0	0		
					0		
			N	0/2.6*	0		
10					0		
			N	0/10.4*	0		
		60			0		grades wet
			N	0/396*	0		
					0		grades with less gravel
15			N	0/128*	0		
					0		grades with occasional gravel
		67	N	0/40*	0		
					0		
			N	0/19.7*	0		
20					0.1		
			N	0	0		
		33			0		
			N	0	0		Bluish gray CLAY with fine to medium sand and gravel (TILL), stiff, moist

Boring terminated at 24 feet on 4/6/04.
1 inch PVC temporary piezometer installed to 24 feet bgs with a 5 foot screen.
Groundwater sample collected using a disposable PE bailer.
Temporary piezometer removed and boring backfilled with bentonite on 4/6/04.
*PID headspace measurements include an initial response and the peak of a delayed response observed from the headspace container (delay response is likely the result of moisture).

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER OSP-17

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave. - Stage I Field Activities, Indianapolis, Indiana

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				0	0		ASPHALT
				0	0		Dark gray silty CLAY with asphalt (weathered), stiff, moist
		67		0	0		grades gray
5				0	0		Dark grayish brown silty CLAY with fine to coarse sand and gravel, very stiff, moist
		100		0	0		
10				0	0		Brown fine to coarse SAND and GRAVEL, loose, wet (shallow groundwater zone)
		100		0	0		grades dense
15				0	0		Dark brownish gray silty CLAY with trace fine to coarse sand and gravel, medium stiff, moist
		100		0	0		Brown fine to coarse SAND and fine to coarse GRAVEL with trace silt, loose, wet
20				0	0		grades without coarse gravel
		100		0	0		
25				0	0		
		100		0	0		
30				0	0		Gray silty CLAY with fine to coarse gravel, hard, dry (Till T-2)

Boring terminated at 30 feet on 2/27/04.
4 foot screen point driven to 30 feet and protective casing retracted for a groundwater sample from the shallow aquifer.
4 foot screen point driven to 50 feet and protective casing retracted for a groundwater sample from the intermediate aquifer.
Screen point removed after sampling and boring backfilled with bentonite on 2/27/04.

LEGEND:

Geoprobe Sample

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

TUCHMAN LOG PHASE2 TUCHMAN KEYSTONE STAGE I 2004.GPJ 5/25/04 Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER
PrePZ-10D

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	PIEZOMETER CONSTRUCTION DETAIL
0							ASPHALT	
			N	0	0		Dark gray silty CLAY with asphalt (weathered), stiff, moist	
		67			0		grades gray without asphalt	
			N	0	0			
5			N	0	0		Dark grayish brown silty CLAY with fine to coarse sand and gravel, very stiff, moist	
		100	N	0	0			
			N	0	0		Brown fine to coarse SAND and GRAVEL, loose, wet (SHALLOW GROUNDWATER ZONE)	
10			N	0	0		grades dense	
		100	N	0	0		Dark brownish gray silty CLAY with trace fine to coarse sand and gravel, medium stiff, moist	
			N	0	0		Brown fine to coarse SAND and GRAVEL with trace silt, loose, wet (SHALLOW GROUNDWATER ZONE)	
15			N	0	0			
		100	N	0	0			
			N	0	0			
20			N	0	0		grades without coarse gravel (fine to medium)	
		100	N	0	0			
			N	0	0			
25		50	N	0	0		Gray SILT with fine sand and trace gravel, wet to moist	
		50	N	0	0		Brown fine to coarse sand and gravel with trace silt, loose, wet	
		100	N	0	0			
30			N	0	0		Gray silty CLAY with fine to coarse sand and gravel, very stiff to hard, dry (TILL T-2)	
		100	N	0	0		grades hard	
		92	N	0	0			
35								

Bentonite and cement grout

Tuchman Cleaners - 14944888.05250 - 4401 N. Keystone Ave.- Stage I Field Activities, Indianapolis, Indiana

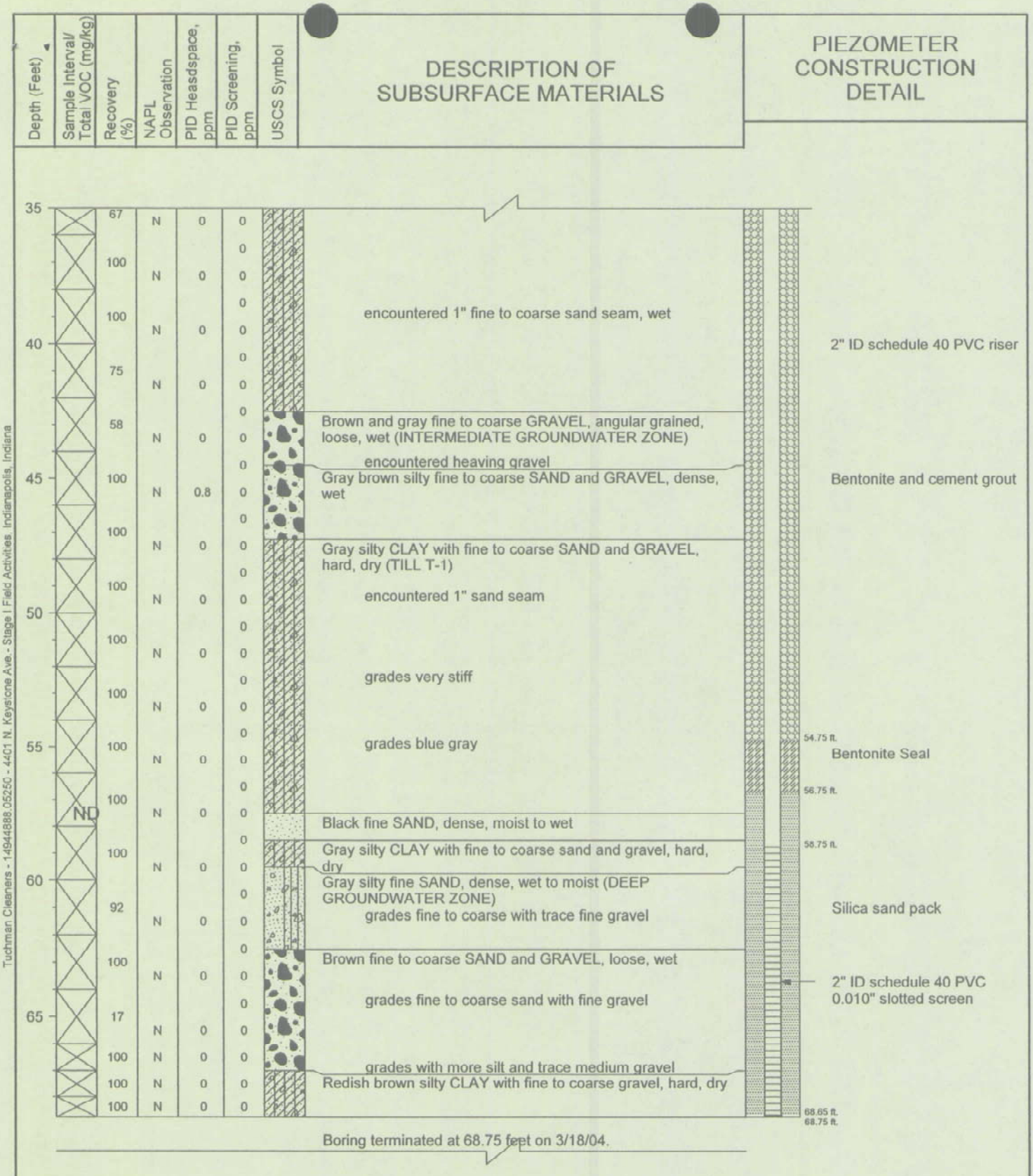
URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER PZ-10D



URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER PZ-10D

Depth (Feet)	Sample Interval/ Total VOC (mg/kg)	Recovery (%)	NAPL Observation	PID Headspace, ppm	PID Screening, ppm	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	PIEZOMETER CONSTRUCTION DETAIL
							(auger refusal on bedrock surface). 2 inch PVC piezometer installed to 68.75 feet with 10 foot screen on 3/18/04 and 3/19/04.	

LEGEND:

Geoprobe Sample Split Spoon

N= No visible fluorescence W= Whitish fluorescence V= Violet fluorescence
SV= Slight Violet fluorescence SW= Slight Whitish fluorescence

PID=Photoionization Detector
NR=No Sample Recovered
ND=Not Detected
NS=Not Sampled

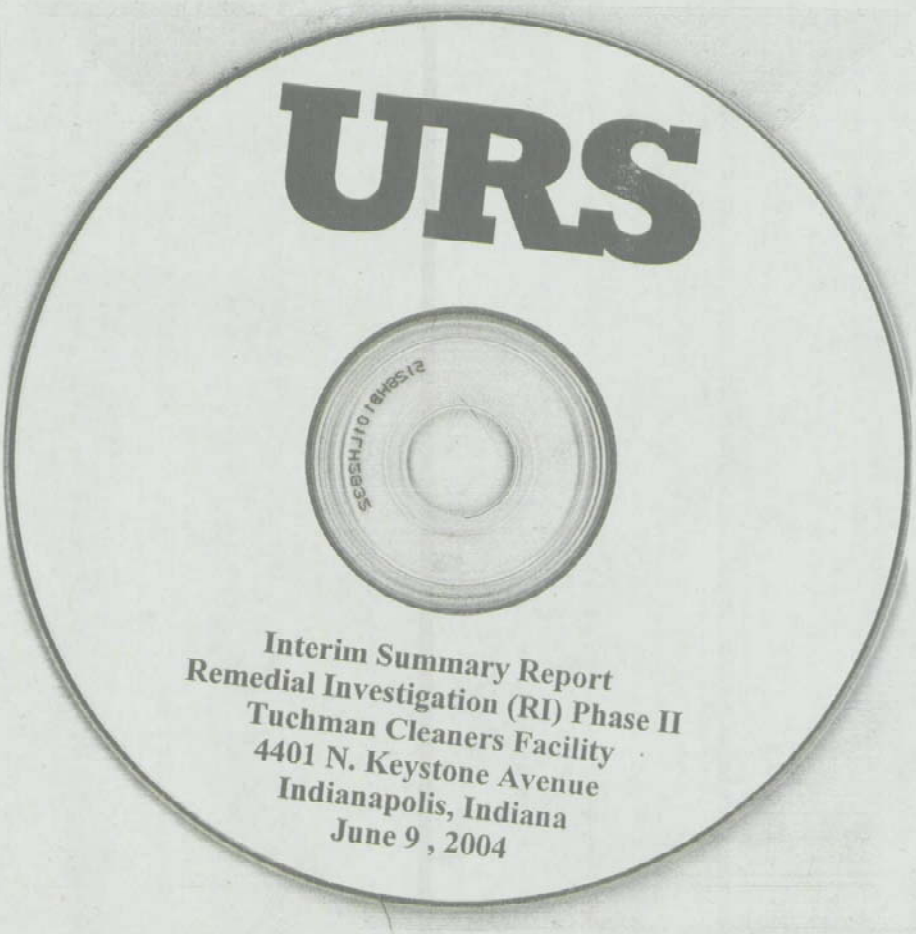
URS

JOB NO. 14944888.05250

Tuchman Cleaners

4401 N. Keystone Ave.- Stage I Field Activities
Phase II - RI
Indianapolis, Indiana

PIEZOMETER
PZ-10D


URS
Interim Summary Report
Remedial Investigation (RI) Phase II
Tuchman Cleaners Facility
4401 N. Keystone Avenue
Indianapolis, Indiana
June 9 , 2004